IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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Applicant	:	Kyusung Kim	Docket No.	:	H0006347
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Examiner	:	Jen, Mingjen			

APPEAL BRIEF OF THE APPELLANT PURSUANT TO 37 C.F.R. § 41.37

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I. INTRODUCTION

This is an Appeal Brief of the Appellant pursuant to 37 C.F.R. § 41.37 appealing the final rejection of the Examiner mailed February 21, 2008. This Appeal Brief is filed within one month of the Notice of Panel Decision from Pre-Appeal Brief Review dated July 1, 2008. Each of the topics required by 37 C.F.R. § 41.37 is presented in this Appeal Brief and is labeled appropriately.

II. REAL PARTY IN INTEREST

Honeywell International, Inc. ("Honeywell") is the real party in interest of the present application. An assignment of all rights in the present application to Honeywell was executed by the inventors and recorded by the U.S. Patent and Trademark Office at Reel 015114, Frame 0119.

III. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to the present application of which Appellant is aware.

IV. STATUS OF CLAIMS

Claims 1-40, which are presented in the Appendix, are the only Claims pending in the present application. Each of the pending Claims 1-40 have been rejected, and the rejections of Claims 1-40 are appealed.

V. STATUS OF AMENDMENTS

There are no other outstanding amendments to the Claims that have been filed subsequent to the final office action.

VI. SUMMARY OF THE CLAIMED SUBJECT MATTER

The embodiment encompassed by independent Claim 1 relates to a method (10) of analyzing a turbine engine to determine a normal engine condition or a faulty engine condition. The method (10) includes the steps of acquiring at least one engine operating parameter (FIG. 1, and p. 7, lines 2-8), calculating at least one engine residual value (11, 13, 15) from said at least one engine operating parameter (FIG. 1, and p. 7, lines 8-15), normalizing said at least one engine residual value (11, 13, 15) to yield at least one normalized engine residual (21, 27, 33) (FIG. 1, and p. 7, line 16 - p. 10, line 1), mapping, via a clustering technique, said at least one normalized engine residual (21, 27, 33) as at least one input vector into an engine condition space having a plurality of clusters, each of said plurality of clusters representing either a normal vector engine condition or a faulty vector engine condition (FIG. 1, and p. 10, line 2 - p. 12, line 11), identifying a closest cluster within said engine condition space, said closest cluster being closer to said at least one input vector than any other of said plurality of clusters (FIG. 1, and p. 12, line 12 – p. 13, line 16), determining a normal engine condition for the engine undergoing analysis if said closest cluster represents a normal vector engine condition (FIG. 1, and p. 13, line 17 – p. 15, line 5), and determining a faulty engine condition for the engine undergoing analysis if said closest cluster represents a faulty vector engine condition (FIG. 1, and p. 13, line 17 – p. 15, line 5).

The embodiment encompassed by independent Claim 22 relates to a computer readable medium having computer-executable instructions for performing a method (10) (FIG. 2, and p. 15, lines 6-19). The method (10) includes calculating at least one engine residual parameter from data generated from a engine model and from engine operating data collected in the field from an engine undergoing analysis (FIG. 1, and p. 7, lines 2-15), normalizing said at least one engine residual value (11, 13, 15) to yield at least one normalized engine residual (21, 27, 33) (FIG. 1, and p. 7, line 16 - p. 10, line 1), mapping via a clustering technique said at least one normalized engine residual (21, 27, 33) as at least one input vector into an engine condition space having plurality of clusters, each of said plurality of clusters representing either a normal vector engine condition or a faulty

vector engine condition (FIG. 1, and p. 10, line 2 - p. 12, line 11), identifying a closest cluster within said engine condition space, said closest cluster being closer to said at least one input vector than any other of said plurality of clusters (FIG. 1, and p. 12, line 12 – p. 13, line 16), determining a normal engine condition for the engine undergoing analysis if said closest cluster represents a normal vector engine condition (FIG. 1, and p. 13, line 17 – p. 15, line 5), and determining a faulty engine condition for the engine undergoing analysis if said closest cluster represents a faulty vector engine condition (FIG. 1, and p. 13, line 17 – p. 15, line 5).

The embodiment encompassed by independent Claim 31 relates to a method (10) of analyzing a turbine engine to determine a normal engine condition or a faulty engine condition. The method (10) includes the steps of acquiring a plurality of engine operating parameters from the turbine engine under analysis (FIG. 1, and p. 7, lines 2-8), calculating a corresponding plurality of engine residual values (11, 13, 15) by comparing each of said engine operating parameters with standard engine characteristics obtained from an engine model (FIG. 1, and p. 7, lines 8-15), computing the mean and the standard deviation of each of said plurality of engine residual values (11, 13, 15) (FIG. 1, p. 7, line 16 – 17, and p. 9, lines 20-23 and 25-27), and normalizing each of said plurality of engine residual values (11, 13, 15) by normalizing said mean to zero and by normalizing said standard deviation to unity to yield a plurality of normalized engine residuals (21, 27, 33), said step of normalizing using normalization factors obtained from a parameter distribution of a normally-operating baseline engine (FIG. 1, and p. 7, line 16 - p. 10, line 1), mapping, via a clustering technique, said normalized engine residuals (21, 27, 33) as input vectors into an engine condition space having a plurality of clusters, each said cluster representing either a normal vector engine condition or a faulty engine vector condition (FIG. 1, and p. 10, line 2 - p. 12, line 11), identifying a closest cluster within said engine condition space, said closest cluster being closer to said input vectors than any other of said plurality of clusters (FIG. 1, and p. 12, line 12 – p. 13, line 16), determining a normal engine condition for the engine under analysis if said closest cluster represents a normal vector engine condition (FIG. 1, and p. 13, line 17 – p. 15, line 5), and determining a faulty engine condition for the engine under analysis if said closest

cluster represents a faulty vector engine condition (FIG. 1, and p. 13, line 17 – p. 15, line 5).

The embodiment encompassed by independent Claim 35 relates to a method (10) of analyzing a turbine engine to determine a normal engine condition or a faulty engine condition. The method (10) includes the steps of inputting data into a self-organizing map from a plurality of reference turbine engines to train said self-organizing map (FIG. 2, and p. 5, line 10 – p. 7, line 8), , acquiring a core speed reading, an exhaust gas temperature reading, and a fuel flow reading for the turbine engine under analysis, calculating a core speed residual value (11), an exhaust gas temperature residual value (13), and a fuel flow residual value (15) by comparing said core speed reading, said exhaust gas temperature reading, and said fuel flow reading with corresponding standard engine characteristics obtained from an engine model (FIG. 1, and p. 7, lines 8-15), computing the mean and the standard deviation of each of said core speed residual value (11, 13, 15), said exhaust gas temperature residual value (11, 13, 15), and said fuel flow residual value (11, 13, 15) (FIG. 1, p. 7, line 16 – 17, and p. 9, lines 20-23 and 25-27), normalizing each of said core speed residual value (11, 13, 15), said exhaust gas temperature residual value (11, 13, 15), and said fuel flow residual value (11, 13, 15) by normalizing said respective means to zero and by normalizing said standard deviation to unity to yield a normalized core speed residual, a normalized exhaust gas temperature residual, and a normalized fuel flow residual, said step of normalizing using normalization factors obtained from a parameter distribution of a normally-operating baseline engine (FIG. 1, and p. 7, line 16 - p. 10, line 1), mapping, via said self-organizing map, said normalized core speed residual, said normalized exhaust gas temperature residual, and said normalized fuel flow residual as respective input vectors into an engine condition space having a plurality of clusters, each said cluster representing either a normal vector engine condition or a faulty vector engine condition (FIG. 1, and p. 10, line 2 - p. 12, line 11), identifying a closest cluster within said engine condition space, said closest cluster being closer to said input vectors than any other of said plurality of clusters (FIG. 1, and p. 12, line 12 – p. 13, line 16), determining a normal engine condition for the engine under analysis if said closest cluster represents a normal

vector engine condition (FIG. 1, and p. 13, line 17 – p. 15, line 5), and determining a faulty engine condition for the engine under analysis if said closest cluster represents a faulty vector engine condition (FIG. 1, and p. 13, line 17 – p. 15, line 5).

VII. GROUNDS OF REJECTIONS TO BE REVIEWED

Claims 1-3, 21, 22, 24, and 25 stand rejected under 35 U.S.C. § 102(b) as 102 as allegedly being anticipated by U.S. Patent No. 5,018,096 (Pettigrew). Claims 4-8, 15, 16, 23, and 26-29 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Pettigrew in view of U.S. Patent No. 5,311,421 (Nomura et al.). Claims 9-14, 17-20, 23, 26-29, and 31-34 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Pettigrew in view of U.S. Patent No. 6,408,259 (Goebel et al.). Claims 30 and 35-40 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Pettigrew in view of Nomura et al. and further in view of Goebel et al.

VIII. ARGUMENT

A. Rejections under 35 U.S.C. § 102.

Applicant's independent Claims 1, 22, 31, and 35 each recite, *inter alia*, the following steps (or a computer readable medium having computer-executable instructions for performing the following steps): calculating a residual value from an engine operating parameter or engine operating data, normalizing the residual to yield a normalized residual, mapping the normalized residual value into an engine condition space having a plurality of clusters, each of said plurality of clusters representing either a normal vector engine condition or a faulty vector engine condition, identifying a closest cluster within said engine condition space, said closest cluster being closer to said at least one input vector than any other of said plurality of clusters, determining a normal engine condition for the engine undergoing analysis if said closest cluster represents a normal vector engine condition, and determining a faulty engine condition for the engine undergoing analysis if said closest cluster represents a faulty vector engine condition.

At least this combination of features is not taught, disclosed, or suggested in Pettigrew. For example, Pettigrew does not disclose at least the steps of calculating a residual value from an engine operating parameter or engine operating data and normalizing the residual value to yield a normalized residual, as is recited in each of Applicant's independent Claims 1, 22, 31, and 35. Rather, Pettigrew only discloses normalizing raw data, and then obtaining residual values from the normalized data. (Pettigrew, at Col. 10, lines 43-53). Pettigrew does not disclose or suggest the step of normalizing the residual values. In short, while Applicant's independent Claims 1, 22, 31, and 35 each recite the steps of calculating a residual value and then normalizing this residual value, Pettigrew discloses the reverse procedure of normalizing data and then creating a residual based on the normalized data.

The Final Office Action asserted that Pettigrew discloses the calculation of a residual value (namely, a "REDD" value) as well as "normalizing engine residual value" (Final Office Action, at p. 29) (citing Pettigrew, at FIG. 4, Steps 206, 208, and 210). However, the Specification of Pettigrew corresponding with Steps 206, 208, and 210 flatly contradicts this assertion of the Final Office Action. Specifically, the Specification of Pettigrew clearly states that "data is first normalized", and then, subsequently, the residual or "REDD" values are obtained therefrom. (Pettigrew, at Col. 10, lines 43-53). Accordingly, Pettigrew does not disclose a step of normalizing the residual (REDD) values. Rather, in Pettigrew, only the raw data is normalized, and this occurs before the residual (REDD) values are even created. Thus, for example, the steps in Pettigrew would result in data that is normalized only with respect to operating conditions, but that would not be normalized with respect to engine-to-engine variation. This is because Pettigrew does not disclose the separate step of normalizing the residual values themselves, as is recited in each of Applicant's independent Claims 1, 22, 31, and 35.

From the above, it should be abundantly clear that there is no disclosure whatsoever in Pettigrew of the steps of calculating a residual value from an engine operating parameter or engine operating data and normalizing the residual value to yield a normalized residual. Accordingly, Applicant's independent Claims 1, 22, 31, and 35

are not anticipated by Pettigrew. Similarly, Applicant's dependent Claims 2-31, 23-30, 32-34, and 36-40 are likewise not anticipated due to their dependence on the respective independent Claims, as well as the other features of these dependent Claims.

B. Rejections under 35 U.S.C. § 103

None of the remaining citations, in particular Nomura et al. and Goebel et al., make up for the glaring deficiencies of Pettigrew. For example, Nomura et al. and Goebel et al. do not disclose at least the steps of calculating a residual value and then normalizing this residual value, as are recited in each of Applicant's independent Claims 1, 22, 31, and 35. Nor is there any assertion in the Final Office that Nomura et al. and Goebel et al. disclose these steps of Applicant's independent Claims 1, 22, 31, and 35.

Accordingly, Applicant respectfully asserts that Applicant's independent Claims 1, 22, 31, and 35 are patentable over the art of record. Similarly, Applicant's dependent Claims 2-31, 23-30, 32-34, and 36-40 are likewise patentable due to their dependence on the respective independent Claims, as well as the other features of these dependent Claims.

IX. CONCLUSION

In view of the foregoing, Appellant submits that the rejection of Claims 1-40 is improper and should not be sustained. Therefore, a reversal of the rejections in the Office action dated February 21, 2008 is respectfully requested.

Respectfully submitted,

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X. CLAIMS APPENDIX

1. (Original) A method of analyzing a turbine engine to determine a normal engine condition or a faulty engine condition, said method comprising the steps of:

acquiring at least one engine operating parameter;

calculating at least one engine residual value from said at least one engine operating parameter;

normalizing said at least one engine residual value to yield at least one normalized engine residual;

mapping, via a clustering technique, said at least one normalized engine residual as at least one input vector into an engine condition space having a plurality of clusters, each of said plurality of clusters representing either a normal vector engine condition or a faulty vector engine condition;

identifying a closest cluster within said engine condition space, said closest cluster being closer to said at least one input vector than any other of said plurality of clusters; and

determining a normal engine condition for the engine undergoing analysis if said closest cluster represents a normal vector engine condition, and determining a faulty engine condition for the engine undergoing analysis if said closest cluster represents a faulty vector engine condition.

2. (Original) The method of claim 1 wherein said engine operating parameter is selected from the group consisting of: core speed, exhausted gas temperature, and fuel flow.

3. (Original) The method of claim 1 wherein said step of acquiring at least one engine operating parameter comprises the step of collecting engine operating data in the field.

4. (Original) The method of claim 1 wherein said step of calculating said at least one engine residual value comprises the step of comparing said at least one engine operating parameter with standard engine characteristics obtained from an empirical engine model.

5. (Original) The method of claim 4 wherein said empirical engine model comprises a polynomial function of engine fan speed.

6. (Original) The method of claim 4 wherein said empirical engine model comprises a neural network.

7. (Original) The method of claim 1 wherein said step of calculating said at least one engine residual value comprises the step of comparing said at least one engine operating parameter with standard engine characteristics obtained from a first principle engine model.

8. (Original) The method of claim 7 wherein said first principle engine model comprises a differential equation representing dynamics of the turbine engine.

9. (Original) The method of claim 1 wherein said step of normalizing comprises the step of normalizing a mean of said at least one engine residual value to zero.

10. (Original) The method of claim 1 wherein said step of normalizing comprises the step of normalizing a standard derivation of said at least one engine residual value to unity.

11. (Original) The method of claim 1 wherein said step of normalizing comprises the step of obtaining a normalization factor from a parameter distribution of a normally-operating baseline engine.

12. (Original) The method of claim 11 further comprising the step of deriving an updated normalization factor if said closest cluster represents a normal vector engine condition.

13. (Original) The method of claim 12 wherein said step of deriving an updated normalization factor comprises the steps of multiplying the square of a current mean normalization factor by a first fraction to obtain a first product; obtaining a current engine parameter from the turbine engine; multiplying said current engine parameter by a second fraction to obtain a second product; and adding said first and second products to yield an updated mean normalization factor.

14. (Original) The method of claim 12 wherein said step of deriving an updated normalization factor comprises the steps of multiplying the square of a current standard deviation normalization factor by a first fraction to obtain a first product; subtracting an updated mean normalization factor from said current engine parameter to obtain a first difference; multiplying the square of said first difference by a second fraction to obtain a second product; subtracting a current mean normalization factor from said current engine parameter to obtain a second difference; multiplying the square of said second difference by a third fraction to obtain a third product; and, taking the square root of said first, second, and third products to yield an updated standard deviation normalization factor.

15. (Original) The method of claim 1 wherein said clustering technique mapping comprises a self-organizing map.

16. (Original) The method of claim 15 further comprising the step of training said self-organizing map for a plurality of epochs using data from a plurality of turbine engines.

17. (Original) The method of claim 1 wherein said clustering technique mapping comprises a method from the group consisting of fuzzy clustering, adaptive resonance theory, K-means algorithm, and Gaussian mixture method.

18. (Original) The method of claim 1 further comprising the step of deriving a belief factor, said belief factor being a function of said normal vector engine condition or said faulty vector engine condition.

19. (Original) The method of claim 18 wherein, when said faulty engine condition is determined for the turbine engine, said belief factor comprises a value derived by subtracting from unity a ratio obtained by dividing a closest distance between said at least one input vector and said closest cluster by a next-closest distance between said at least one input vector and a next closest cluster.

20. (Original) The method of claim 18 wherein, when said normal engine condition is determined for the turbine engine, said belief factor comprises a value derived by subtracting from unity a maximum ratio of the set of ratios obtained by dividing a distance between said at least one input vector and said closest cluster by each of a set of respective fault distances between said at least one input vector and all clusters representing a faulty vector engine condition.

21. (Original) The method of claim 1 wherein said faulty engine condition is selected from the group consisting of: an exhaust temperature sensor failure, a combustor liner burn-through failure, and a bleed band leakage failure.

22. (Original) A computer readable medium having computer-executable instructions for performing a method, wherein said method comprises:

calculating at least one engine residual parameter from data generated from a engine model and from engine operating data collected in the field from an engine undergoing analysis;

normalizing said at least one engine residual value to yield at least one normalized engine residual;

mapping via a clustering technique said at least one normalized engine residual as at least one input vector into an engine condition space having plurality of clusters, each of said plurality of clusters representing either a normal vector engine condition or a faulty vector engine condition;

identifying a closest cluster within said engine condition space, said closest cluster being closer to said at least one input vector than any other of said plurality of clusters; and

determining a normal engine condition for the engine undergoing analysis if said closest cluster represents a normal vector engine condition, and determining a faulty engine condition for the engine undergoing analysis if said closest cluster represents a faulty vector engine condition.

23. (Original) The computer readable medium of claim 22 wherein said clustering technique mapping comprises a method from the group consisting of self-organizing mapping, fuzzy clustering, adaptive resonance theory, K-means algorithm, and Gaussian mixture method.

24. (Original) The computer readable medium of claim 22 wherein said method further comprises inputting into the computer engine operating data collected in the field.

25. (Original) The computer readable medium of claim 22 wherein said method further comprises inputting into the computer standard engine characteristics obtained from said engine model.

26. (Original) The computer readable medium of claim 22 wherein said method further comprises inputting into the computer normalization factors obtained from a normally-operating baseline engine.

27. (Original) The computer readable medium of claim 22 wherein said method further comprises calculating a closest distance between said at least one input vector and said closest cluster.

28. (Original) The computer readable medium of claim 27 wherein said method further comprises calculating a belief factor, in response to a determination of said faulty engine condition, by dividing said closest distance by a next-closest distance between said at least one input vectors and a next closest cluster and subtracting the result from unity.

29. (Original) The computer readable medium of claim 27 wherein said method further comprises calculating a belief factor, in response to a determination that the engine condition is normal, by subtracting from unity a maximum ratio from the set of ratios obtained by dividing said closest distance by each of a set of respective fault distances between said input vectors and the set of all clusters representing a faulty condition.

30. (Original) The computer readable medium of claim 27 wherein said method further comprises inputting data from a plurality of turbine engines into said self-organizing map to train said self-organizing map.

31. (Original) A method of analyzing a turbine engine to determine a normal engine condition or a faulty engine condition, said method comprising the steps of:

acquiring a plurality of engine operating parameters from the turbine engine under analysis;

calculating a corresponding plurality of engine residual values by comparing each of said engine operating parameters with standard engine characteristics obtained from an engine model;

computing the mean and the standard deviation of each of said plurality of engine residual values;

normalizing each of said plurality of engine residual values by normalizing said mean to zero and by normalizing said standard deviation to unity to yield a plurality of normalized engine residuals, said step of normalizing using normalization factors obtained from a parameter distribution of a normally-operating baseline engine;

mapping, via a clustering technique, said normalized engine residuals as input vectors into an engine condition space having a plurality of clusters, each said cluster representing either a normal vector engine condition or a faulty engine vector condition;

identifying a closest cluster within said engine condition space, said closest cluster being closer to said input vectors than any other of said plurality of clusters; and

determining a normal engine condition for the engine under analysis if said closest cluster represents a normal vector engine condition, and determining a faulty

engine condition for the engine under analysis if said closest cluster represents a faulty vector engine condition.

32. (Original) The method of claim 31 wherein said plurality of engine operating parameters comprises a core speed measurement, an exhausted gas temperature measurement, and a fuel flow measurement.

33. (Original) The method of claim 31 wherein said clustering technique mapping comprises a method from the group consisting of self-organizing mapping, fuzzy clustering, adaptive resonance theory, K-means algorithm, and Gaussian mixture method.

34. (Original) The method of claim 31 further comprising the step of deriving a belief factor wherein, if turbine engine condition is determined to be faulty, said belief factor comprises a value derived by subtracting from unity a ratio obtained by dividing a distance between said input vectors and said closest cluster by a distance between said input vectors and a next closest cluster, and wherein, if said engine is determined to be normal, said belief factor comprises a value derived by subtracting from unity a maximum ratio of the set of ratios obtained by dividing a distance between said input vectors and said closest cluster by each of the set of fault distances between said input vectors and all clusters representing a faulty condition.

35. (Original) A method of analyzing a turbine engine to determine a normal engine condition or a faulty engine condition, said method comprising the steps of:

inputting data into a self-organizing map from a plurality of reference turbine engines to train said self-organizing map;

acquiring a core speed reading, an exhaust gas temperature reading, and a fuel flow reading for the turbine engine under analysis;

calculating a core speed residual value, an exhaust gas temperature residual value, and a fuel flow residual value by comparing said core speed reading, said exhaust gas temperature reading, and said fuel flow reading with corresponding standard engine characteristics obtained from an engine model;

computing the mean and the standard deviation of each of said core speed residual value, said exhaust gas temperature residual value, and said fuel flow residual value;

normalizing each of said core speed residual value, said exhaust gas temperature residual value, and said fuel flow residual value by normalizing said respective means to zero and by normalizing said standard deviation to unity to yield a normalized core speed residual, a normalized exhaust gas temperature residual, and a normalized fuel flow residual, said step of normalizing using normalization factors obtained from a parameter distribution of a normally-operating baseline engine;

mapping, via said self-organizing map, said normalized core speed residual, said normalized exhaust gas temperature residual, and said normalized fuel flow residual as

respective input vectors into an engine condition space having a plurality of clusters, each said cluster representing either a normal vector engine condition or a faulty vector engine condition; and

identifying a closest cluster within said engine condition space, said closest cluster being closer to said input vectors than any other of said plurality of clusters; and, determining a normal engine condition for the engine under analysis if said closest cluster represents a normal vector engine condition, and determining a faulty engine condition for the engine under analysis if said closest cluster represents a faulty vector engine condition.

36. (Original) The method of claim 35 further comprising the step of calculating a closest distance between said at least input vectors and said closest cluster.

37. (Original) The method of claim 36 further comprising the step of calculating a belief factor for said faulty engine condition by dividing said closest distance by a next-closest distance between said input vectors and a next closest cluster and subtracting the result from unity.

38. (Original) The method of claim 36 further comprising the step of calculating a belief factor for said normal engine condition by subtracting from unity a maximum ratio from the set of ratios obtained by dividing said closest distance by a fault distance between said input vectors and the set of all clusters representing a faulty condition.

39. (Original) The method of claim 36 further comprising the step of deriving an updated normalization factor if said closest cluster represents a normal vector engine condition, said step of deriving an updated normalization factor including the steps of multiplying the square of a mean normalization factor by a first fraction to obtain a first product, obtaining a current engine parameter from the turbine engine, multiplying said current engine parameter by a second fraction to obtain a second product, and adding said first and second products to yield an updated mean normalization factor.

40. (Original) The method of claim 39 wherein said step of deriving an updated normalization factor further comprises the steps of multiplying the square of a current standard deviation normalization factor by a third fraction to obtain a third product; subtracting said updated mean normalization factor from said current engine parameter to obtain a first difference; multiplying the square of said first difference by a fourth fraction to obtain a fourth product; subtracting said mean normalization factor from said current engine parameter to obtain a second difference; multiplying the square of said second difference by said second fraction to obtain a fifth product; and, taking the square root of the sum of said third, fourth, and fifth products to yield an updated standard deviation normalization factor.

XI. EVIDENCE APPENDIX

No evidence pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 has been entered by the Examiner or relied upon by Appellant in the instant appeal beyond that which is already contained in the as-filed application, as is delineated in the Arguments section of this Brief.

XII. RELATED PROCEEDINGS APPENDIX

As there are no related appeals and interferences, there are also no decisions rendered by a court or the Board of Patent Appeals and Interferences that are related to the instant appeal.